# Excavations at the Lal-lo Shellmiddens, Northeast Luzon, Philippines

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BARBARA THIEL

## INTRODUCTION

THE LAL-LO SHELLMIDDENS are located in Cagayan Province, Lal-lo municipality, between the towns of Gattaran and Lal-lo, east of the Cagayan River in northeast Luzon (18°07'N, 120°41'E) (Fig. 1). The site is not a true shellmound in the sense of one large, deep mound or midden, but rather a series of scattered midden areas that occur in an area over one kilometer long and from 50 to 200 m east of the river (Fig. 2). I heard that there are also middens several kilometers north of this area, but I did not have time to survey that region. The Cagayan River at this point is approximately 8 m above sea level. There is a rise of a few meters at the river bank, and then level to gradually rising land to the east for 50 to 150 m, and then hills east of that. Midden areas can be detected by shell and/or sherds exposed on the surface. There are midden areas on the level land at the base of the hills, and on the slopes and tops of the hills.

The Cagayan Valley National Road, which runs along the western edge of the midden areas, was rebuilt during 1969–1972. During this time the western edge of some of the midden areas was bulldozed away for use as landfill for the road. As a result, the location and thickness of the midden areas that were cut into can be seen in the roadcut. These vary in thickness between 20 cm and one meter. They are often overlain by 10–20 cm of soil. Many midden areas are also present to the east of the roadcut, and have shell and sherds on the surface. These midden areas very from a few meters to over 70 m in length or width. At a few places in the roadcut it looks like the deposits are 2–4 m deep, but this is not actually the case. When parts of these middens were bulldozed away the shell and sherds from some of the remainder of the deposit washed down onto the soil of the hill below the deposits, making them look much deeper than they actually are. On closer inspection these areas can be seen to be erosional. There is no location along the roadcut where the cultural deposit is thicker than 1.5 m, though this does not necessarily mean there are no deeper deposits elsewhere.

Barbara Thiel is affiliated with the Department of Sociology and Anthropoloy, Northern Kentucky, Highland Heights, Kentucky.

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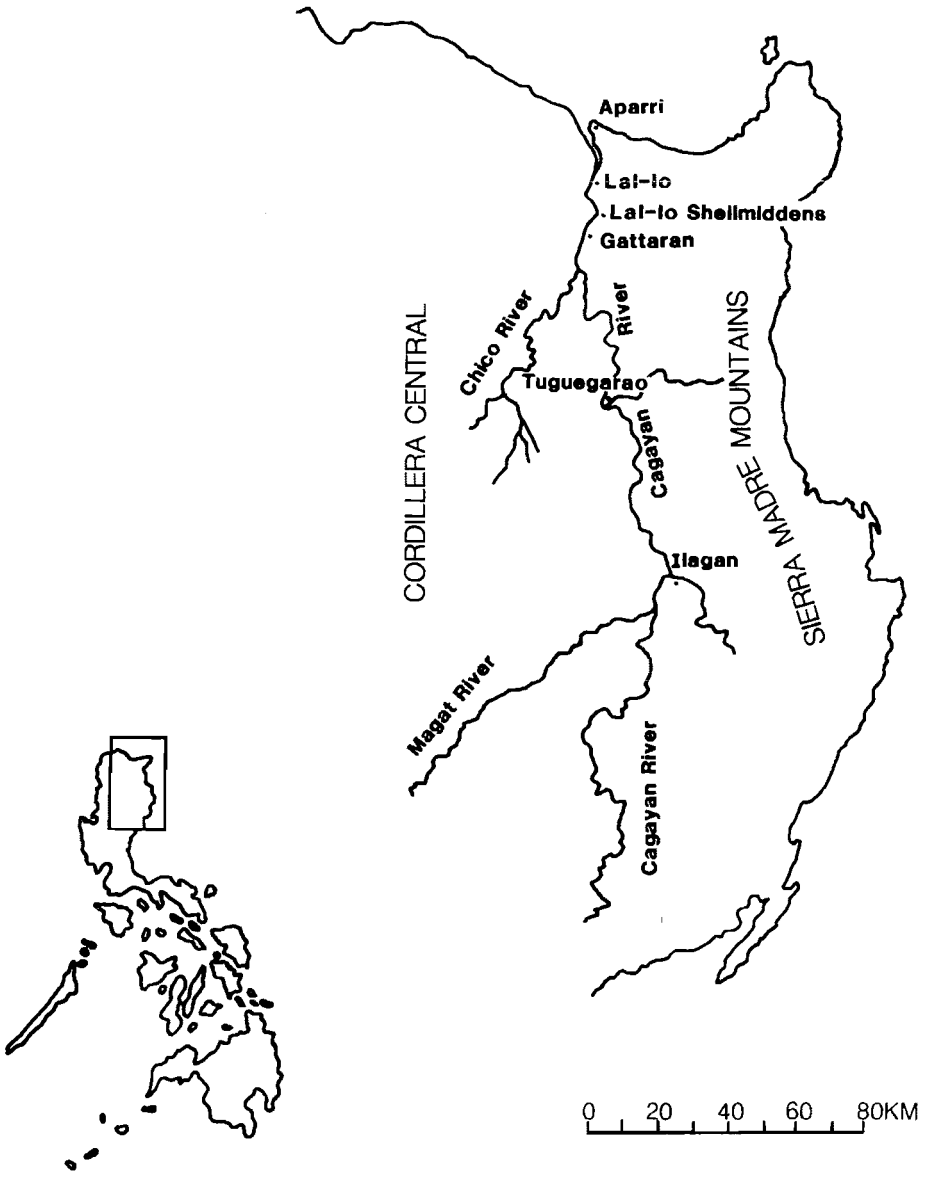


Fig. 1 Northeast Luzon showing the location of the Lal-lo shellmiddens.

This particular kilometer-long area would have been better-suited to prehistoric occupation than either the region directly to the north or south, which are broad, low-lying regions, because it has a somewhat higher elevation and would have been less subject to flooding.

In 1972, an archaeologist then at the National Museum of the Philippines conducted a brief test excavation and found shell, pottery, ground stone tools, and a few other artifacts (Cabanilla n.d.), but the results of the excavation have never been reported.

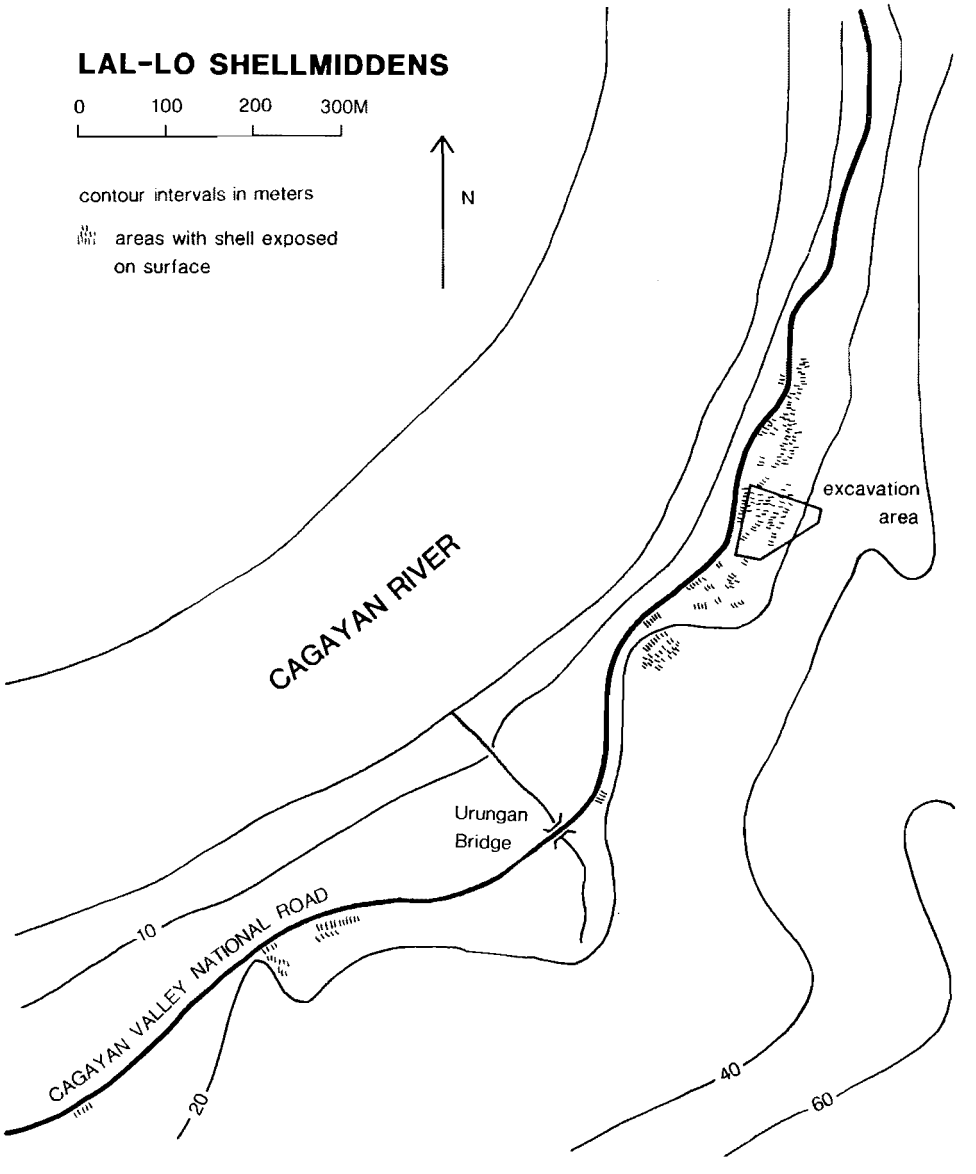


Fig. 2 The Lal-lo shellmiddens.

## ENVIRONMENT

The Lal-lo Shellmiddens are in the Cagayan Valley physiographic region, which consists of the valleys of the Cagayan River, three major tributary rivers, and numerous smaller tributaries. The discharge volume of the Cagayan River is the largest in the Philippines. The Cagayan Valley region is 250 km long, and varies from 70 km to 100 km wide. The valley is bounded on the east by the Sierra Madre Mountains, which are rugged mountains with peaks over 1800 m. To the south are the Caraballo Mountains, with maximum elevations between 1500 and 1800 m. The

western boundary is the Cordillera Central, a high mountain complex with several peaks over 3050 m (Wernstedt and Spencer 1967:314). Many regions of the valley itself are quite hilly, but elevations of hills in the valley are seldom over 500 m.

The climate of the Cagayan Valley is somewhat different from other areas in the Philippines because it is closed off to the east, south and west by mountains, and has a higher latitude. Annual rainfall ranges from 150 to 200 cm per year, from June to November. The remaining months are usually dry. Typhoons are frequent in northern Luzon, but the effect is minimized in the Cagayan Valley because of the protection of the surrounding mountains. There is a greater seasonal temperature range than in the rest of the Philippines because of the interior location of the valley and the higher latitude (Wernstedt and Spencer 1967:316). The natural vegetation of the area is dipterocarp forest (Wernstedt and Spencer 1967:91).

## THE EXCAVATIONS

### *Introduction*

The particular area I chose for excavation is near the center of the kilometer-long area (Fig. 2). This area was chosen because of its central location, and because there were large areas of shell exposed on the surface, as well as areas without shell. The area has a level to gently rising area for 20 to 50 m east of the road, which is 75 m east of the river, then a hill (30° slope), with a large relatively level area at the top of the hill. I wanted to excavate areas in the level region near the river, areas on the hill and at the top of the hill, and also both areas with and without shell on the surface to test for possible differences in cultural use patterns, differences in artifact assemblages, and temporal differences. This seemed like a good area. The area is now covered with secondary growth dipterocarp forest.

The excavation was conducted for ten weeks from February to May 1977. I hired and trained local men as excavators.

### *Methodology*

An arbitrary datum point was established near the center of the lower level area (Fig. 3). Both horizontal and vertical measurements were referenced to this datum. The natural terrain features and slope of the hill are in a SW–NE direction, so a site north was chosen, which is 45 degrees E of true (magnetic) north. All direction references are to site north. An east-west baseline and north-south line were staked out every 4 m from the datum point, and elevations were taken where possible (sometimes large trees were in the way). The grid lines are designated by one meter intervals north or south and east or west of datum. Excavation units are named by the two grid lines of the southwest corner of the two-meter unit.

Two somewhat different excavation methods were used, which depended on whether there was shell in the square. In excavation units without shell the soil was excavated with trowels and bolos (a native short machete) and sifted through 1.5 mm screen. Arbitrary excavation levels were used; these levels followed the natural slope or contours of the ground surface. I had intended to use natural or cultural soil layers as excavation layers, but these were not present. The soil is a uniform dark

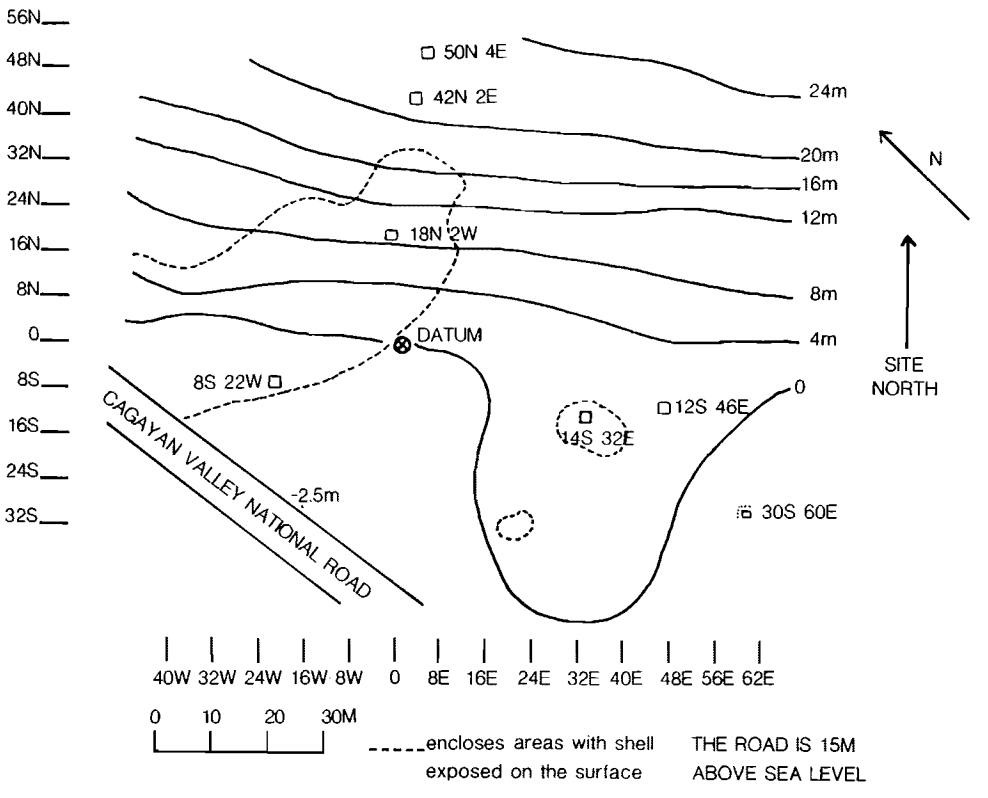


Fig. 3 The excavation area.

brown (Munsell dark brown 10YR 3/3) loamy forest soil from the surface down to near bedrock. In some areas in the lower levels the soil becomes clayey and a somewhat lighter color (dark yellowish brown 10YR 4/4) near bedrock, which is sandstone. This type of soil profile, or lack of it, is typical where sandstone is the underlying material (Wernstedt and Spencer 1967:67, 70). There were also no soil differences as a result of cultural deposits. The excavation levels are generally 15 cm, but there is some variation, as listed in Table 1. This is because my workmen, though good excavators, sometimes had trouble stopping at 15 cm.

In excavation units with shell, which was often very dense, it was impossible to screen. In some areas it almost seemed as if the deposits were about four-fifths shell and one-fifth pottery, with a very small amount of soil holding them together. In these units the soil was excavated a small amount at a time to loosen it, and then picked through by hand. The shell was cleaned off somewhat and all of it was kept to obtain the volume amount for each excavation level. After the volume for each level was obtained, a sample of shell was kept and the rest was thrown out with the backdirt. Sherds and other artifacts were kept separate for each level.

### *The Excavation Units*

Each of the 2 m excavation units is widely separated, is on different types of terrain features, and contain somewhat different cultural materials. Therefore, I will

TABLE 1. QUANTITY OF MATERIALS EXCAVATED

| SQUARE | EXCAVATION LEVEL | DEPTH | SHELL (LITERS) | SHERDS | PIG BONE FRAGMENTS |
|---|---|---|---|---|---|
| 50N 4E | 1 | 0–15 cm | 0 | 76 | 0 |
| | 2 | 15–30 | 0 | 106 | 0 |
| | 3 | 30–50 | 0 | 244 | 0 |
| | 4 | 50–65 | 0 | 353 | 0 |
| | 5 | 65–80 | 0.06 | 560 | 3 |
| | 6 | 80–95 | 1 | 243 | 0 |
| | 7 | 95–110 | 0.08 | 291 | 0 |
| | 8 | 110–125 | 0.12 | 227 | 0 |
| | 9 | 125–135 | 0.05 | 99 | 0 |
| | 10 | 135–155 | 0 | 28 | 0 |
| | 11 | 155–170 | 0 | 6 | 0 |
| | 12 | 170–190 | 0 | 8 | 0 |
| | 13 | 190–205 | 0 | 5 | 0 |
| 18N 2W | 1 | 0–20 | 66 | 608 | 17 |
| | 2 | 20–35 | 384 | 597 | 9 |
| | 3 | 35–45 | 503 | 699 | 10 |
| | 4 | 45–65 | 311 | 603 | 0 |
| | 5 | 65–80 | 99 | 249 | 0 |
| | 6 | 80–95 | 26 | 100 | 0 |
| | 7 | 95–125 | 0 | 0 | 0 |
| 42N 2E | 1 | 0–25 | 0 | 110 | 1 |
| | 2 | 25–40 | 20 | 654 | 59 |
| | 3 | 40–55 | 33 | 223 | 6 |
| 14S 32E | 1 | 0–15 | 410 | 701 | 7 |
| | 2 | 15–30 | 894 | 608 | 12 |
| | 3 | 30–45 | 695 | 313 | 58 |
| | 4 | 45–60 | 146 | 133 | 29 |
| | 5 | 60–65 | 6.6 | 33 | 0 |
| 12S 46E | 1 | 0–15 | 4 frags. | 81 | 0 |
| | 2 | 15–30 | 0 | 346 | 0 |
| | 3 | 30–45 | 0 | 824 | 17 |
| | 4 | 45–60 | 0 | 676 | 12 |
| | 5 | 60–75 | 6.6 | 455 | 8 |
| | 6 | 75–90 | 0.5 | 262 | 4 |
| | 7 | 90–105 | 0.25 | 310 | 0 |
| | 8 | 105–125 | 0 | 128 | 0 |
| 30S 60E | 1 | 0–15 | 0 | 44 | 6 |
| (1 $m^2$) | 2 | 15–30 | 0.25 | 130 | 1 |
| | 3 | 30–45 | 0.3 | 141 | 2 |
| | 4 | 45–60 | 5 frags. | 118 | 7 |
| | 5 | 60–80 | 0 | 95 | 4 |

first discuss each excavation unit separately and then discuss the artifacts and the site as a whole.

The first units excavated were 50N 4E, 18N 2W, and 8S 22W. The first is on top of the hill without shell on the surface, the second on the hill with shell on the surface, and the third on the lower level area with shell on the surface. At a considerable distance to the east and somewhat farther north there is a level area on top of the

hill with shell on the surface, but I did not have time to excavate there. The quantity of materials recovered is listed in Table 1.

50N 4E

Unit 50N 4E is at the top of the major slope, but there is still a slight slope to the north for a distance of 1000 m. The surface of the square was nearly level, with no visible shell. This unit was the deepest one excavated, with soil over 205 cm deep. By 65 cm there were some large stones present in the square, by 95 cm it was half stone (bedrock), by 135 cm three-fourths stone, and by 205 cm about nine-tenths stone. There continued to be cultural material (sherds) present even at this depth, but we could not excavate any further because the small amount of soil between the stones was too hard to get at.

Much of the soil in this square could be alluvion from the slight slope to the north, which accumulated because this area was at the time lower than surrounding areas (for example, as compared with 42N 2E).

This unit contained a very small amount of shell. The upper levels, till about 65 cm, had none at all. The middle levels, from 65 cm to 135 cm contained less than one-eighth liter of broken pieces of shell per 15 cm level. Below 135 cm there was again no shell.

The major cultural material in the unit, as in all the units, was pottery. A total of 2227 sherds was excavated, the most being found in the middle levels. Amounts range from 76 in the first level, increasing in each level to 560 in level 5 (65 to 80 cm), and decreasing to just a few in the lowest levels. Also excavated were fragments of ground stone tools at 57 and 72 cm, the butt of a large adze at 119 cm and three pig (*Sus* sp.) bones from level 5 (65 to 80 cm). (It could not be determined if the pigs were wild or domesticated. Most of the bones in this and other areas were fragmentary.) A carbon date of 390 ± 110 B.P. (A.D. 1560) (Gak-7047) was obtained on charcoal from a depth of 62 cm. This date may seem late for this depth, but there could have been a lot of inwash in this area, so I think the date is probably reliable.

18N 2W

Unit 18N 2W is near the center of the area on the slope of the hill; the surface was thickly covered with shell and a few sherds. The unit was excavated to a depth of 120 cm where bedrock was reached in all areas of the square. However, by a depth of 65 cm some large stones were appearing in the square, and by 95 cm about one-fourth the square was down to bedrock. The lower 25 cm of soil (from 95 to 120 cm) was clay with no shell or artifacts.

This unit contained considerable quantities of shell, with the greatest quantity in the middle levels. The upper 15 cm excavation level contained 66 liters (a liter is equivalent to 61 cubic inches), of shell, the second level 384 liters, the third level 503 liters, level 4 had 311 liters, level 5 had 99 liters, and level 6 (80–95 cm depth) had 26 liters of shell.

There were also great quantities of pottery in the unit, a total of 2788 sherds, with the greatest quantities in the upper and middle levels. Level 1 had 608 sherds, level 2 had 597, level 3 had 699, level 4 had 603, level 5 had 249, and level 6 had 100. Level 1 also contained 17 pig (*Sus* sp.) bones, one ground stone adze fragment, and three iron fragments. Level 2 contained a fragment of a ground stone tool, a frag-

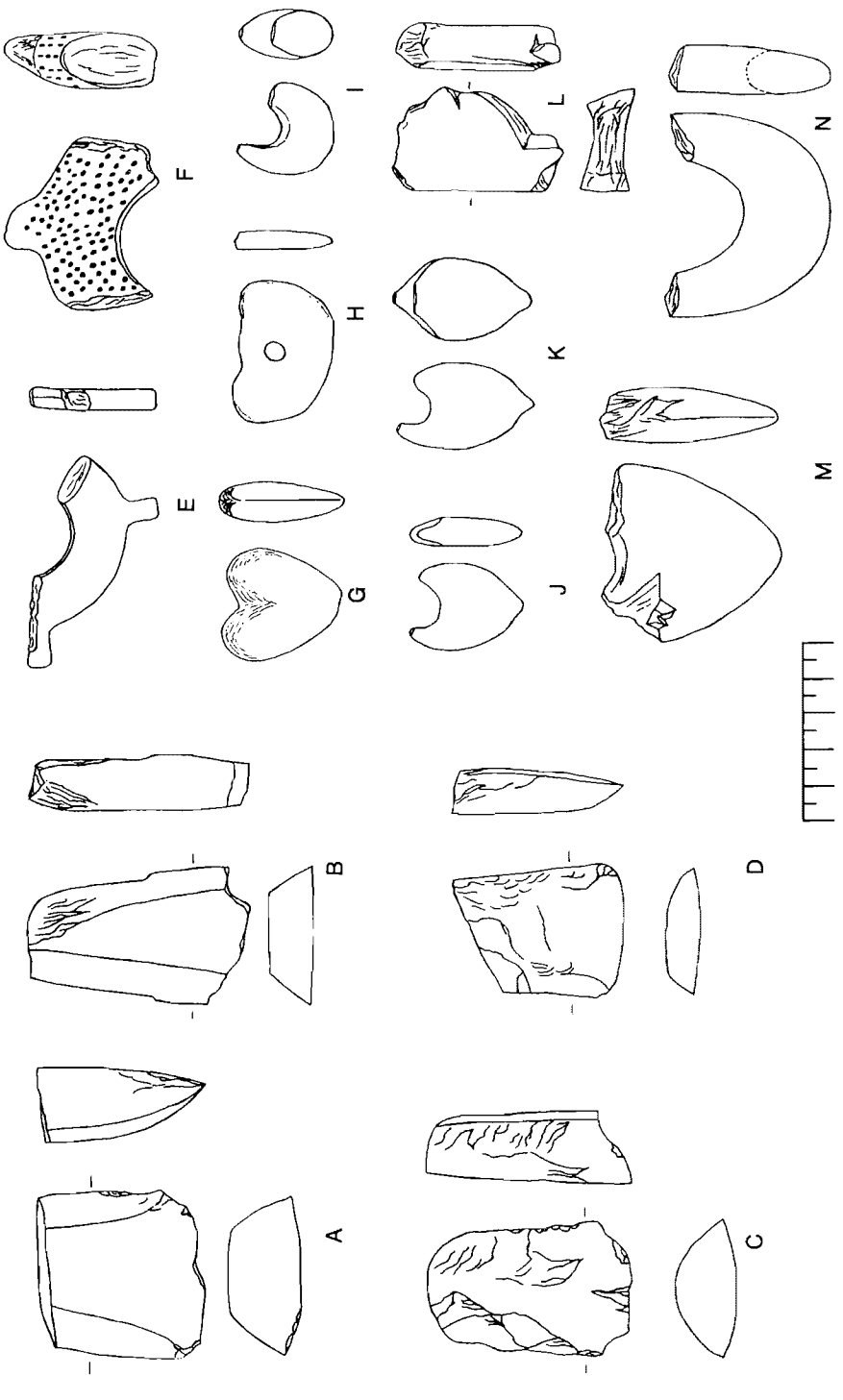


Fig. 4 A–D Ground stone adzes; E–N artifacts excavated.

ment of a fired clay ornament, nine fragments of pig bone, and one flint flake. Level 3 contained ten fragments of pig bone, and one small fired clay ring with external projections (Fig. 4H), and level 4 had a ground stone adze fragment (Fig. 4D).

Since this unit is on a 30° slope, the cultural deposit may not be the result of activities that occurred at that location, but may be materials that have washed down from farther up or on top of the hill, or they may have been thrown down the hill by people living at the top. However, if this is the case, it seems odd that there is no shell on top of the hill.

42N 2E

This unit is on top of the hill, but close to the edge of the slope. It was chosen because it is between 50N 4E and 18N 2W and to try to shed some light on the very different nature of the deposits in these two squares (but did not really succeed in doing so). The unit was very shallow. By 40 cm about half the square was down to bedrock, and by 55 cm the entire unit was bedrock. In the upper 25 cm (level 1) there was no shell in the unit. In the next 15 cm (level 2) there were 20 liters, and in the lower 15 cm (level 3) there were 33 liters. Level 1 also contained one pig bone, level 2 had 59 bones, and level 3 had six.

This unit also had a great deal of pottery. Level 1 contained 110 sherds, there were 654 sherds in level 2, and 223 sherds in level 3. No other artifacts were present in the unit.

8S 22W

Unit 8S 22W is on the lower level area, at the southeast limit of a large area of shell exposed on the surface (Fig. 3). The southeast limit was chosen because I wanted a square with shell, but away from a disturbed area. The bulldozer had taken some of the deposit from the region, which on Fig. 3 would be west of datum about at the 4 m contour interval. Unit 8S 22W seemed to be well out of the disturbed area, but excavation proved that this was not the case. However, the unit was excavated for about 1 m before the stratigraphy revealed that it was disturbed. This was unfortunate, both because of the time spent on the square and because many artifacts besides pottery were found here, which were out of provenience.

The excavation focus was then shifted much farther east to an area well away from any disturbance. Two squares, 14S 32E and 12S 46E, were chosen because they were both on the lower level area and were near each other, but one had shell on the surface and one did not.

14S 32E

This unit had more shell than any other excavated area. Level 1 contained 410 liters of shell; 894 liters were found in level 2, 965 liters in level 3, 146 liters in level 4, and 6.6 liters in level 5. By the base of level 4 (60 cm), about three-fourths of the square was down to bedrock. Level 5 was a thin level that took off the rest of the soil to bedrock in the remainder of the square at 65 cm.

This unit also had a great deal of pottery. Level 1 had 701 sherds, level 2 had 608, level 3 had 313, level 4 had 133, and level 5 had 33. Level 1 also contained three iron fragments and another piece of metal that appears to be bronze. In addition, level 1 contained seven pig bones, level 2 contained 12, level 3 had 58 pig bones, three pig teeth, and three deer teeth, and level 4 had 29 pig bones.

12S 46E

In this square a lot of stone started appearing relatively soon. By the base of level 3 (45 cm), about one-fourth the square was stone. By 60 cm it was one-third stone, by 75 cm one-half stone, by 90 cm three-fourths stone, and the entire square was down to bedrock by 125 cm.

Although this square is in the same area and at about the same elevation as 14S 32E, and is only 14 m from it, it contained almost no shell. The first 15 cm excavation level contained four fragments of shell, the next three levels, down to 60 cm contained no shell at all. Level 5 (60–75 cm) contained 6.6 liters, level 6 (75–90 cm) contained one-half liter, level 7 (90–105 cm) contained one-fourth liter, and the remainder of the square down to bedrock at 125 cm contained no shell.

This square contained considerable amounts of pottery. Level 1 had 81 sherds, level 2 had 346, 824 in level 3, 676 in level 4, level 5 had 455, level 6 had 262, level 7 had 310, and level 8 had 128. Level 3 also contained 17 pig bones, one fragment of iron, and a ground stone object that is possibly a whetstone (Fig. 4L). Level 4 contained 12 pig bones, one earring (similar to Fig. 4K), one flint flake, and one iron fragment. In level 5 were found 8 pig bones and one iron fragment. Level 6 contained one deer tooth and four pig bones. A carbon date of 3790 ± B.P. (1840 B.C.) (GaK–7048) was obtained on shell found in level 6 at a depth of 85 cm. Below 90 cm there were no artifacts besides pottery.

30S 60E

This was the last square excavated. Since I was running out of time, only the southeast one-meter of the square was excavated. This unit is on the lower level area, with a slightly lower elevation than the other squares. There were no shell or sherds visible on the surface.

This square proved to be relatively shallow and very stony. By the bottom of the first level (15 cm) the square was one-fourth stone. By 45 cm it was three-fourths stone, with bedrock being reached in all areas by 80 cm. The square contained very little shell. Level 1 had none. Level 2 had one-fourth liter, level 3 a little more than one-fourth liter, and levels 4 and 5 had just a few fragments of shell each.

There was a lot of pottery, though, particularly since it is only a one-meter square. Level 1 had 44 sherds, level 2 had 130, level 3 had 141, level 4 had 118, and level 5 had 95 sherds. Level 1 also contained two iron fragments, 14 pieces of broken glass (modern looking), and six pig bones. Level 2 had one piece of glass and one pig bone, level 3 had 2 pig bones, level 4 had 7 pig bones, and level 5 had 4 pig bones.

## CULTURAL REMAINS

### *Pottery*

The pottery is by far the most numerous artifact category excavated. A total of 12,206 sherds were excavated and analyzed; there were no whole vessels. The sherds tended to be small and it was not possible to reconstruct any vessels.

Eight types of pottery were excavated at the site (Table 2). The most common type (40 percent of the sherds) has a medium grain sand and shell temper. Probably due to variations in firing, the colors range from orange to light brown.[1] For convenience I will refer to this type of pottery as orange. The second most

TABLE 2. PERCENTAGE OF POTTERY TYPES

| | POTTERY TYPE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ORANGE | BUFF | RED SLIPPED | RED BROWN | DARK RED BROWN SLIPPED | BLACK | GREY TAN | GREY |
| Percentage of 12,206 total sherds | 40 | 29 | 11 | 8 | 5 | 4 | 3.5 | 0.6 |
| Percentage of 237 decorated sherds | 43 | 10 | 21 | 7.5 | 7.5 | 8 | 1.3 | 1.8 |

common type (29 percent) is a thick ware with a coarse sand temper. It has a uniform buff or beige color with a dark grey core. Eleven percent of the pottery is red slipped with a medium grain sand and shell temper. This type seems to be the same as the orange pottery, but with the addition of a slip. Eight percent is red-brown with coarse sand and shell temper. Five percent is dark red-brown slipped, similar to the orange and red slipped except for the much darker colored slip. Four percent is polished black with medium-fine sand temper; 3.5 percent is grey-tan with medium-fine sand temper. Grey pottery is .6 percent. These are very smooth sherds with very fine sand temper. The polished black, grey-tan and grey are all generally thin and well made.

Of the 12,206 total sherds, there are 10,327 body sherds, 1676 rim sherds, 138 sherds of carinated shoulders, and 65 sherds of ring feet. The 1676 rim sherds represent approximately 1336 vessels. (If two or more identical rim forms of the same type were found in the same level of the same square, it was assumed they were from the same vessel.) There are 319 different rim forms. Representative rim forms are shown in Figs. 5 and 6. The majority are bowls of various forms (Fig. 5, Figs. 6-1 to 6-19). Eighty-three percent of the rim sherds (71 percent of the 319 rim forms) are bowls. The most popular forms (21 percent of the rim sherds) are simple bowls with slightly curved rims and rounded lips (Figs. 5-3, 5-5, 5-7). Everted rim vessels are the second most common category (Figs. 6-20 to 6-36) and constitute 6 percent of the rim sherds (10 percent of the forms). The third most common type is flat dishes with upturned rims (Figs. 5-16 to 5-21) (5.6 percent of sherds, 3 percent of forms). Other types present are globular vessels (or oillas, without an articulated rim) (Figs. 6-37, 6-40, 6-41, 6-46, 6-47, 6-48, 6-49) (3.5 percent of sherds, 8.5 percent of forms); straight-sided vessels (Figs. 6-43, 6-44, 6-45) (1 percent of sherds, 4 percent of forms), and bowls with inturned lips or rims (Figs. 6-15 to 6-19) (.36 percent of sherds, .9 percent of forms). There are also 138 body sherds of carinated vessels (Figs. 6-50 to 6-58), seven different kinds of handles (Figs. 6-59, 6-60, plus other forms not illustrated), and 65 sherds of ring feet of 16 different forms (Figs. 6-61 to 6-76), most of which seem to be from bowls.

Several things about the rim forms as a collection are distinctive. One is the very high percentage of bowls; a second is the large number that have a thickened flat tilted lip on the rim, for example Figs. 5-23, 5-24, 5-27, 5-45, 5-67, 5-68, 5-77, 6-2,

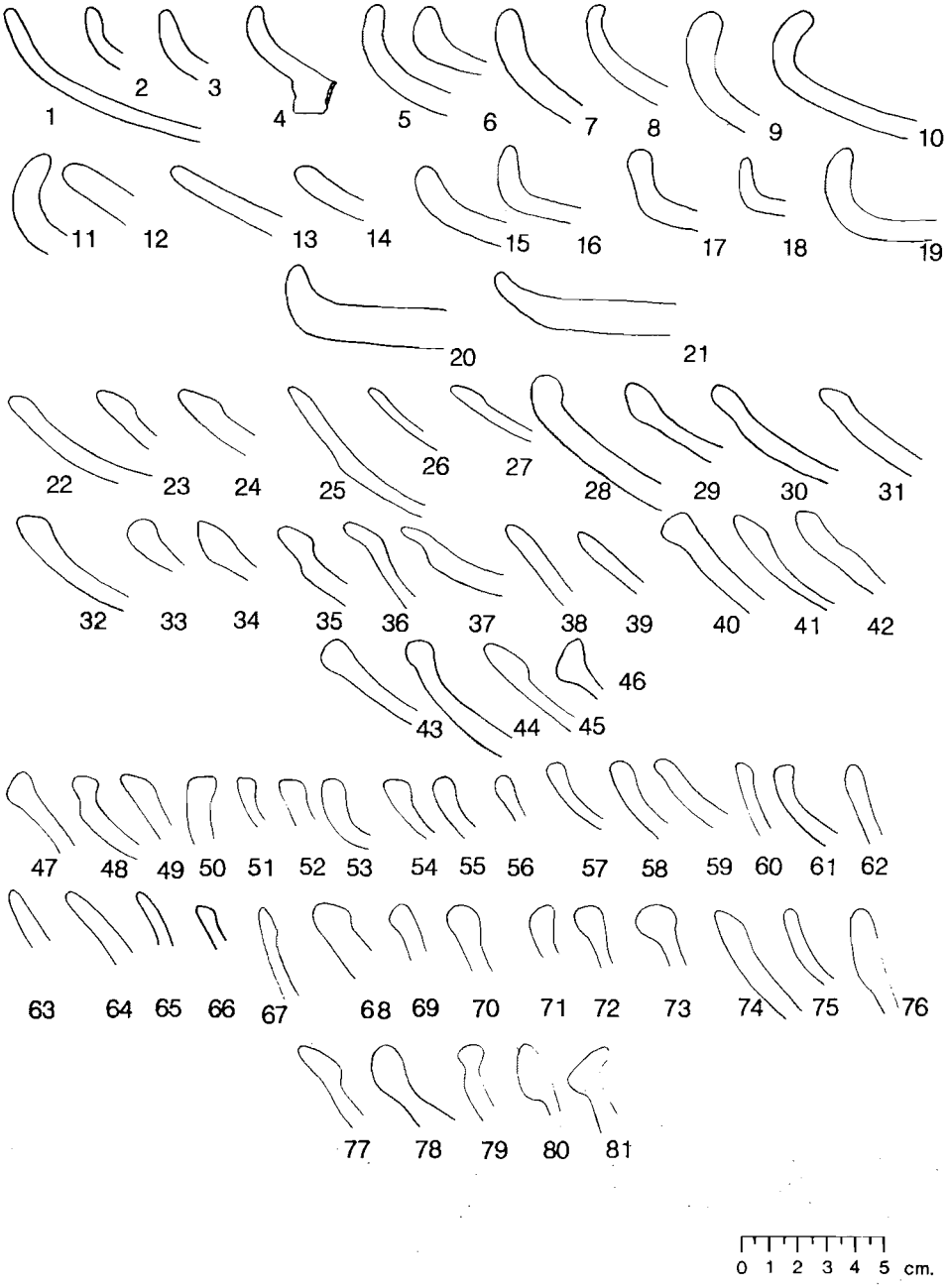


Fig. 5 Rim forms. Vessel opening to the right.

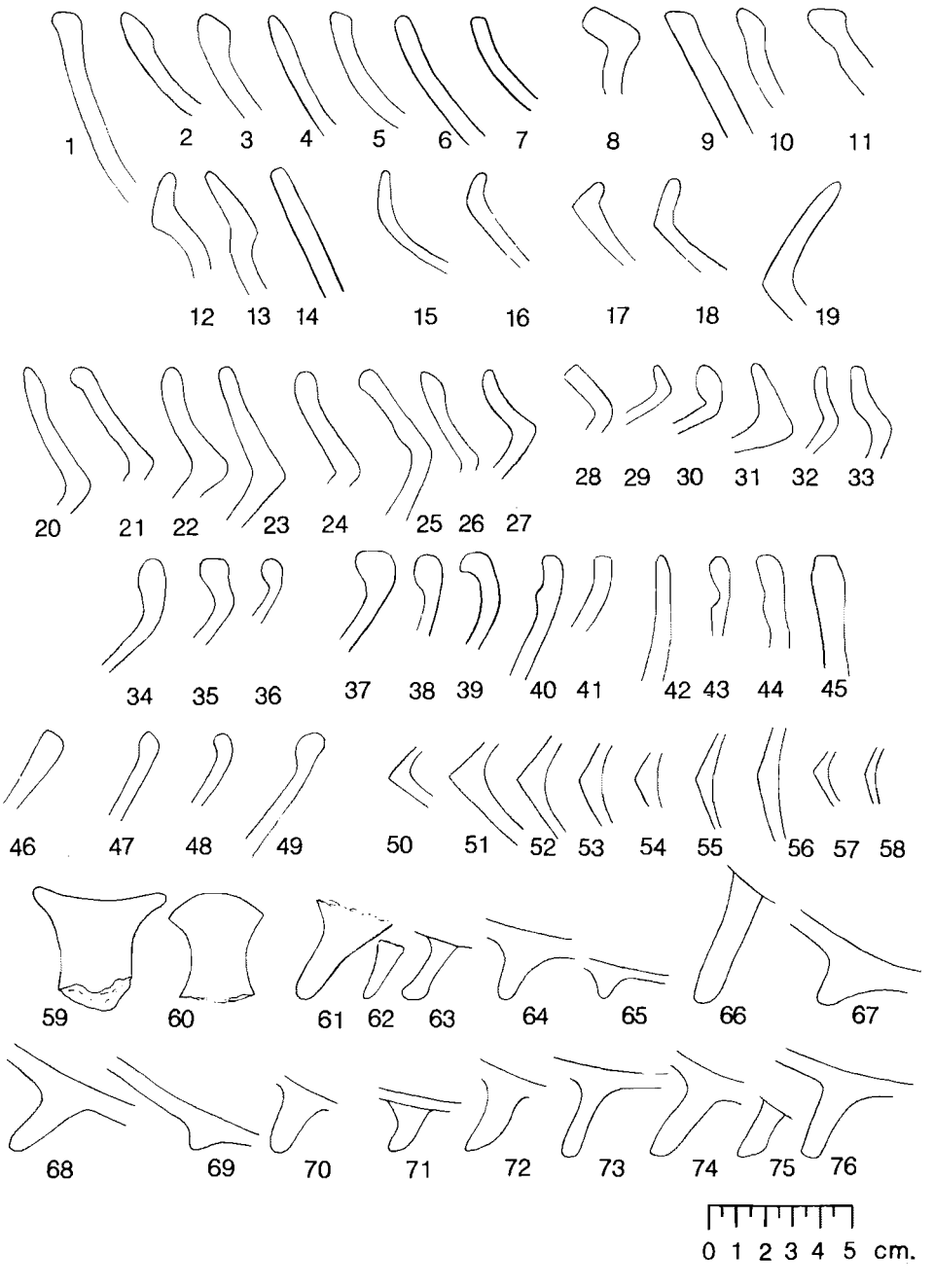


Fig. 6 1–49 rim sherds; 50–58 carinated shoulders; 59–60 handles; 61–76 ring feet. Vessel opening to the right.

6-3, and 6-20. Nineteen percent of the rim sherds have this type of lip. There are also many (4 percent) rims with flat tops, for example Figs. 5-52, 6-5, 6-7, 6-9, 6-14, 6-28, 6-41, and 6-45. Another distinctive feature is the large number of rims with unusual lip forms (various, but especially Figs. 5-46, 5-47, 5-81, 6-8, 6-12, and others not illustrated).

The percentages of pottery types of the various rim forms are 40 percent orange, 19 percent buff, 17 percent red slipped, 6 percent dark red brown slipped, 3.4 percent black, 5.2 percent red brown, 1.5 percent grey, and 1 percent grey tan. The percentages of types of the various rim forms are about the same as the overall percentages, with some notable exceptions. Thirty-one percent of the everted rim vessels are red slipped, and only one sherd (of 90) of this form—a very small orange one (Fig. 6-29)—is decorated (pottery decorations are discussed below). Bowls and deep bowls with thickened flat lips (for example Figs. 5-23, 5-24, 5-27, and 6-2) have a much higher than average percentage of red slipped, 40 percent. Of the noncurved rim, rounded lip bowls (Figs. 5-13, 5-38, 5-39) 47 percent (16 of 34 sherds) are red slipped, and none are buff. Of the bowls with a slightly curved neck and rounded lip (Figs. 5-3, 5-5, 5-9) 46 percent (175 of 379 sherds) are buff, and none of this form are decorated. The flat-bottomed dishes with upturned rims (Figs. 5-16 to 5-21) have an even higher percentage of buff, 59 percent (52 of 88 sherds); none of the dishes are red slipped or decorated. Of the carinated shoulders (138 sherds) only 6 percent are buff.

### *Pottery Decorations*

Of the 12,206 total sherds only 251, 2 percent, are decorated. Most of the decorations are on rims; 12 percent of the rim sherds are decorated, 15 percent of the carinated shoulders are decorated, and one ring foot is decorated. The 251 decorated sherds represent 237 vessels (if two or more sherds of the same type with identical decorations were found in the same level of a square they were assumed to be from the same vessel), 160 of which are represented by rim sherds. There is a total of 114 different decorations, a representative sample is illustrated in Figs. 7 and 8. These can be divided into ten major categories. The most common is small punctate dots (and occasionally dashes) in rows, zig-zag lines, or geometric patterns (Figs. 7A–M, O); 54 percent of the 237 decorated vessels have this type of decoration. Seven percent have incised circles with dots or incised lines (Figs. 7T, 7U, 8A, 8B, 8D, 8E, 8H, 8J), 6 percent have small punctate dots with incised lines (Figs. 7P, 7Q, 7R, 7S), 9 percent have incised lines in geometric patterns (Figs. 8C, 8F, 8G, 8I, 8K), 2.5 percent have cross-hatching (Fig. 8L), and 1.3 percent have large punctate dots (Fig. 7N). The remaining decorations are different from the dot and incised line variety. Fourteen percent have raised lines (or impressions between the lines) that seem to have been made with a paddle (Fig. 8M), 4 percent have slight narrow indentations, two sherds (.84 percent) have paddle-impressed squares or rectangles (Fig. 8N), and one sherd has a small incised curvilinear scroll decoration that looks totally out of place among the others (Fig. 8O).

Many of the decorations made only with small punctate dots were very simple. Eighteen percent (43) of the 237 decorated sherds have only a single row of dots (Fig. 7A), 14 percent (32 sherds) have one row of zig-zag dots (Fig. 7B), and 12 percent have two parallel, zig-zag, or diamond-shaped rows of dots (Figs. 7D, 7E, 7I).

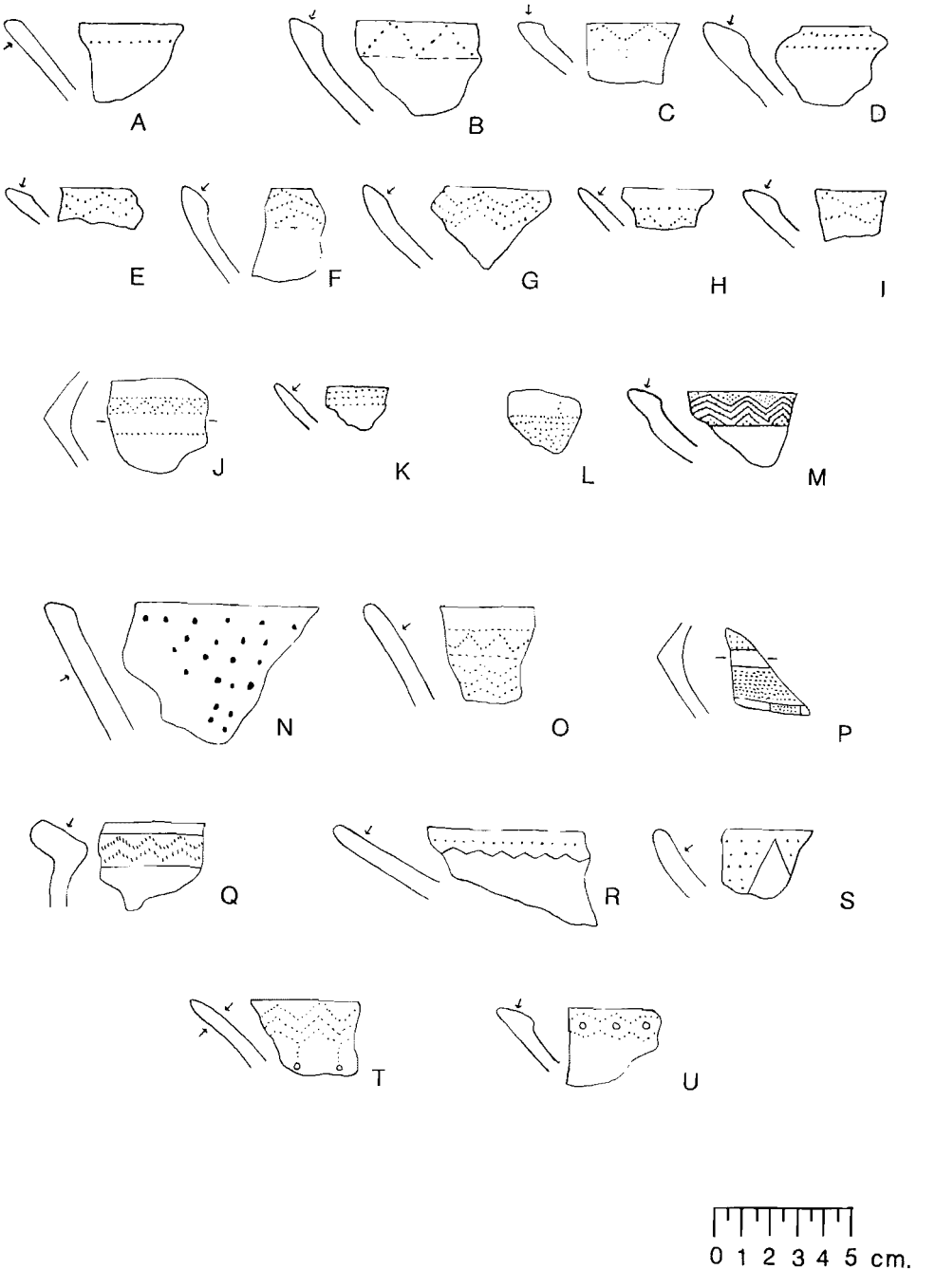


Fig. 7 Decoration forms. Vessel opening to the right. Arrows show location of decoration on sherd.

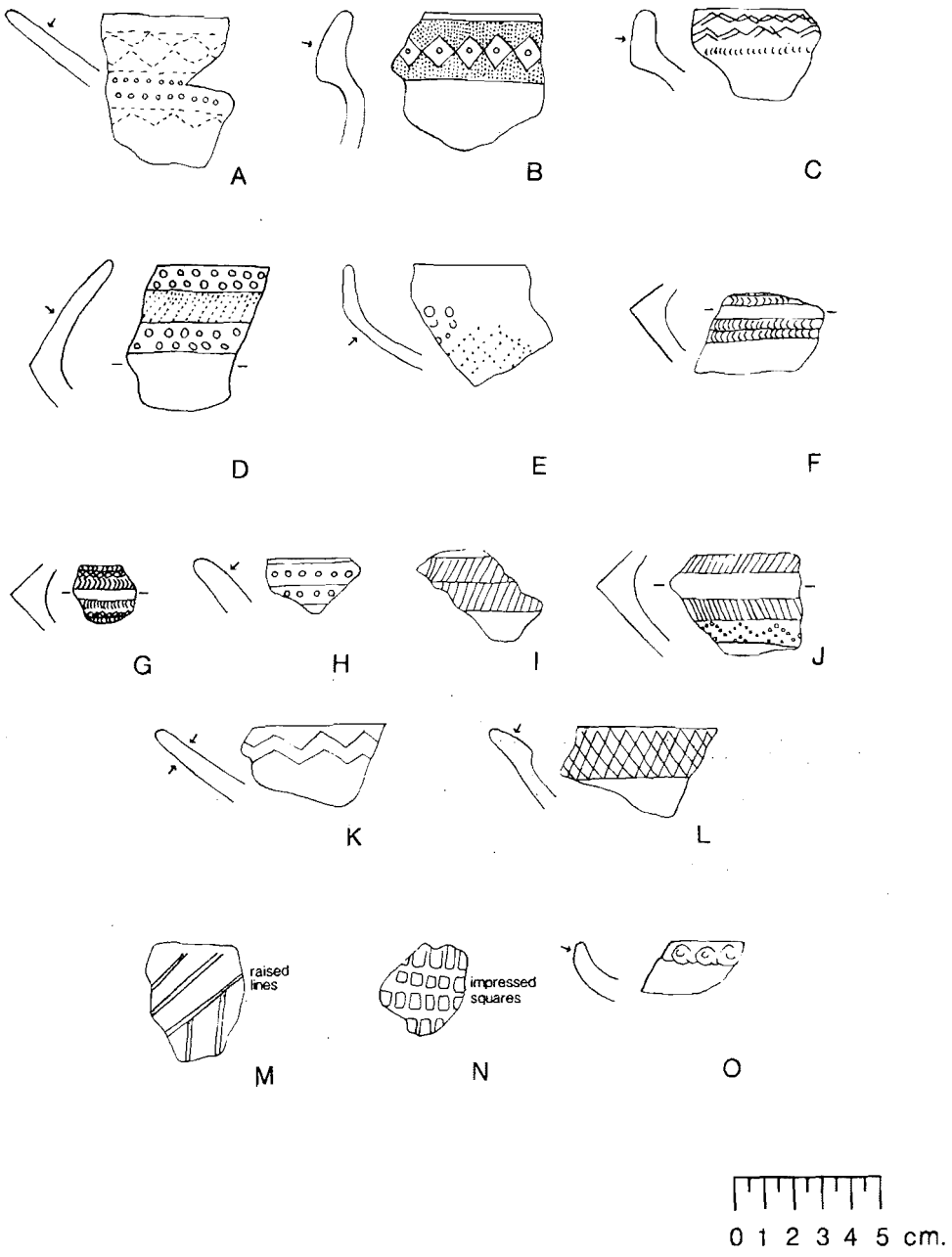


Fig. 8 Decoration forms. Vessel opening to the right. Arrows show location of decoration on sherd.

The location of the decorations on the rims is often unusual, with many on the inside of the vessel. Fifty-nine percent are on the outside of the rim (such as Fig. 7A); 26 percent are on the inside of the rim (Fig. 8A); 6 percent are on the inside top of rims with thickened flat lips (Fig. 7B and Fig. 7Q); 5 percent are on the top of rims with flat lips (Fig. 7C); 3 percent have decorations on both the inside and the outside (Figs. 7T and 8K) (two sherds have the same decoration on both the inside and outside, one sherd has two different patterns), and one sherd is decorated on the outside top of a rim similar to Fig. 5-46.

The percentages of various types of pottery are different for decorated sherds than for undecorated sherds in three cases. Only 10 percent of the decorated sherds are buff, which is only one-third of that color of undecorated sherds (29 percent). This is accounted for by the large number of buff bowls that are undecorated. Twenty-one percent are red slipped, which is almost twice that for the undecorated sherds (11 percent), and 8 percent are black, twice the undecorated rate of 4 percent. All other colors are under 8 percent. Orange is about the same with 43 percent of the decorated sherds, and 40 percent of the undecorated. There is an interesting feature of the carinated shoulders: 15 percent (of 138 sherds) are decorated. Of these 33 percent are black, which is four times the rate for undecorated shoulders, or decorated sherds in general, which are both 8 percent. In addition, several of the black decorated shoulder sherds have white lime infill (Fig. 8F is one example). Another interesting note is that 43 percent of the sherds with a single row of small punctate dots (Fig. 7A) are red slipped.

The lower percentage of buff is also true for the number of decorated rims. Only 8 percent of the buff rim sherds are decorated, whereas from 17 percent to 21 percent of the other types of rims are decorated.

### *Temporal Relationships*

Since I had limited funds for carbon dates, I hoped to be able to seriate the rim forms, decoration types, or pottery types, but this was not possible. Even though the pottery at the site represents over 3400 years, there is very little change through time. The common rim forms—the various bowls, rims with thickened flat lips, rims with rounded lips, everted rim vessels, and carinated shoulders—are found in almost every level of all excavated squares. Some of the uncommon rim forms are found only in certain squares or levels, but these forms are represented by only a few sherds, so the variance is not significant and could be accounted for by sampling error.

Decoration types do not vary significantly either. The most common decoration, a single row of small punctate dots, is found everywhere. Other common decoration types, small punctate dots in rows, zig-zags, or geometric patterns, and narrow raised (or wide impressed) lines (Fig. 8M) are also found in most levels of all excavated squares. As with the rim forms, the only decoration forms that show much variance are those represented by only a few sherds, which is not significant. The pottery at the site seems to represent a very long-lasting tradition of vessel forms and decoration types.

The percentages of various types of pottery vary somewhat from level to level and square to square, but there are no regular patterns. The only noteworthy variation that may be significant is that black pottery is not present in any level of 12S 46E, but is present in all other squares. Since this is the square that had the early

carbon date, black pottery may have been a later introduction at the site. Or, this variation may be due to another factor.

### *Ground Stone Tools*

Five broken ground stone adzes and six fragments of ground stone tools that were probably adzes were excavated. They are all made of indurated shale, which is locally available in the northern Cagayan Valley. Four are trapezoidal (Figs. 4A, 4B, 4D), and one is lenticular (Fig. 4C). The lenticular adze is not smoothly ground over the entire surface but retains flaking scars from an earlier stage of manufacture. One of the trapezoidal adzes (Fig. 4D) has very fine edge damage and appears to have been used in fine woodworking.

The adzes are all broken, and look as if they were snapped in two. This condition could be the result of heavy woodworking, particularly since indurated shale is a relatively brittle material for adzes.

In addition to the adzes, another ground stone tool, illustrated in Fig. 4L, has two concave sides, which are ground down quite smooth. It may be a whetstone.

Two flint flakes were also excavated.

### *Iron*

Thirteen iron fragments were excavated. All are badly corroded, not shaped like anything in particular, and seem to be broken pieces. Eight are small fragments (1–3 cm) and come from the upper 14 cm in squares 18N 2W, 14S 32E, and 30S 60E. Two are from 8S 22W (the disturbed square). The remaining three are from 12S 46E. One is from level 3 (43 cm depth), a larger piece, about $20 \times 6 \times 1$ cm, in an irregular shape. The second piece is from level 4 (53 cm) and measures $12 \times 3 \times 1$ cm. The third piece is a small fragment from level 5 (71 cm). These latter three fragments are particularly important because 12S 46E is the square with the early carbon date, 3790 B.P., from a depth of 85 cm in level 6. This is somewhat deeper than any of the iron pieces, but it indicates that the iron from this square may date quite early, particularly the fragment at 71 cm.

There are small deposits of iron ore at Camalaniugan (Wernstedt and Spencer 1967:318), only 18 km north of the site. Although the deposits are too small to be profitably mined commercially, they could have been mined in prehistoric times.

In addition to the iron found at the site, there is also one piece of bronze, from a depth of 11 cm in 14S 32E. It is an irregular, bent shape, $4 \times 2$ cm and very thin.

### *Ornaments*

Seven earrings, four possible pendants, three rings, and one other ornament were excavated, all were broken. The earrings are all made of fired clay. One (Fig. 4I) (with the top broken off) is similar to the lingling-o type but is without the projection. Four others (Fig. 4J) are similar but have more of a heart shape. Two others (Fig. 4K) have a globular heart shape.

Four fired clay artifacts are possibly pendants. One is illustrated in Fig. 4M. Two others are the same shape, but are smaller, one about two-thirds this size, and one about half this size. The fourth possible pendant is illustrated in Fig. 4N. Another artifact (Fig. 4G), made of fired clay, seems originally to have been an earring whose top had broken off and was then ground into a heart-shaped ornament.

Fig. 4H is a small fired clay broken ring. Fig. 4F is also a broken fired clay ring with a punctate decoration. Fig. 4E, another ring, has external projections; it is ground shale, very smooth, and finely made.

## DISCUSSION

A major activity of the occupants of the site seems to have been shellfish collecting. All the shell is *Batiss* spp., a freshwater bivalve that still grows in the Cagayan River, and is collected by the local people. The large quantities of pottery also show heavy use of the area. However, given the large amounts of shell and pottery, there is a surprising lack of other materials. There are animal bone, adzes, iron, and ornaments, but these are only present in very small amounts. What is most unusual is that there are no postmolds, fireplaces or features of any kind. There is not much general "living debris," except for the shell and pottery. The lack of these materials may simply be due to sampling error. Due to the very small percentage of the site that was actually excavated, these things may in fact be present, but were missed in the excavation. They were certainly not present in the excavated areas. In the squares with shell, postmolds would have been very easy to spot as a round area with no shell. In the squares without shell they would have been more difficult to detect because the soil is dark brown. However, I checked carefully, but found no evidence of them.

There are also no fireplaces. If there were houses present and they were built with the floor much above the ground, as is common in the area today, they may have had the cooking fires in the houses, which would have left no evidence of fires in the ground. However, one would expect old charcoal and ashes, charred bones, etc., to have been dumped somewhere or otherwise to have made their way into the deposit at the site. With the exception of the small amount of charcoal in 50N 4E, there was no charcoal in any of the other excavated areas. As stated, these things may have been present, but were missed due to sampling error. The site could be interpreted as a village area where the inhabitants collected shellfish, hunted or raised pigs, did woodworking, and probably raised crops nearby. However, this interpretation is highly speculative and needs more data from further excavation to be demonstrative.

The site could also be interpreted as a seasonal or periodic short-term shellfish collecting station. The people may also have fished, hunted and engaged in other activities on a limited basis. They may have come to the river for a few weeks each year primarily to use the shell resources, then returned to their villages in the hills to the east. Or, this could have been one of several seasonal camping areas. This interpretation would explain the large amounts of shell, but lack of postmolds, features, and much living debris. Since no other sites in the entire region have been excavated, this hypothesis will have to await further research to determine possible relationships between this site and sites in surrounding areas.

Another possibility is that the site could be the result of a small group of people who lived there permanently, possibly for several years. Even a few people can accumulate large amounts of shell if it is a primary resource.

An unusual aspect of the site is the nature of the shell deposits. In areas where there is shell on the surface, there is shell from the surface to bedrock, along with many sherds. In areas where there is no shell on the surface, there is no (or extremely little) shell from the surface to bedrock, but there are still many sherds. The shell

TABLE 3. RADIOCARBON DATES

| LAB NO. | SQUARE | DEPTH FROM SURFACE | MATERIAL DATED | UNCORRECTED DATE B.P. | CORRECTED DATE B.P. | ONE SIGMA RANGE B.P. |
|---|---|---|---|---|---|---|
| GaK–7047 | 50N 4E | 62 cm | charcoal | 380 ± 110 | 390 ± 110 | 280–500 |
| GaK–7048 | 12S 46E | 85 cm | shell | 3680 ± 110 | 3790 ± 110 | 3680–3900 |

GaK = Gakushuin University
Uncorrected dates are based on a Libby half-life of 5570 years.
Corrected dates are based on a half-life of 5730 years.

seems to have been deposited in discrete middens, which, in the absence of flooding or disturbance, have been covered by the developing soil. For some reason, the sherds seem to have been deposited in a more scattered fashion.

### *Temporal Relationships*

Two carbon dates were obtained (Table 3). The earliest date is 3790 ± 110 B.P. (1840 B.C.) obtained from shell at a depth of 85 cm in 12S 46E, which is in the lower level area. The other date is 390 ± 110 B.P. (A.D. 1560) on charcoal from a depth of 62 cm in 50N 4E, which is on top of the hill. The two dates are separated by a considerable distance, both horizontally and vertically.

The site shows a relatively long time span, 3400 years, with very little cultural change. However, the site is not particularly well dated. Only two carbon dates were obtained, and one of these, the early date, is on shell, which is more subject to error than charcoal. It is not possible to state how reliable this date is though it fits well with the materials that were excavated with it. It is reasonable that the site is this old. The shellfish are a good, easily obtainable resource that is likely to have been used by at least 3800 B.P. It would not surprise me if the site were over 5000 years old. I also think the charcoal date (390 B.P.) is probably accurate. The glass fragments in the upper 30 cm of 30S 60E provide an independent recent date showing that the site was used until very recently.

Although it is possible that the site was used only during two time periods, once around 3800 B.P., the other time around 400 B.P., I think this is very unlikely. The site is very large and contains widely scattered shell deposits. Various areas of the site were probably used at different times during the past 4000 or more years, although the exact nature and time of the various occupations cannot be determined without further excavation. The site probably represents a relatively stable cultural pattern of shellfish utilization with other activities engaged in on a limited basis. The pottery represents a long cultural tradition of at least 3400 years.

## EXTERNAL RELATIONSHIPS

The site has some similarities to, but also some important differences from, other Philippine sites. The trapezoidal adzes are a common Philippine type; lenticular adzes, although present, are not as common. The earrings are of a common type, but the heart-shaped ones are an unusual variation.

The pottery at the site is quite distinctive. The decoration type of small punctate dots in rows and geometric patterns represents a distinctive cultural pattern for the

Philippines, with one exception. The very high percentage of bowls is also quite unusual, as are the variety of unusual lip forms.

The one area in the Philippines that does have some similar pottery decorations is the Batungan Caves sites on the island of Masbate, 675 km south of Lal-lo. This pottery is decorated with small punctate dots, incised circles, and incised lines. Many of the decorations are very similar to those at Lal-lo, though the vessel forms are different. Most of the Batungan pottery are everted rim pots. Also found at Batungan were animal bone, ground stone tools, flint flakes, and two iron tools. A carbon date on charcoal of 2710 ± 100 B.P. (760 B.C.) was obtained (Solheim 1968).

Four other areas, all outside the Philippines, have pottery decorations similar to those at Lal-lo. One is the Yuan-Shan culture of northern Taiwan. This is a Neolithic culture characterized by shellmounds. Artifact types present in Yuan-Shan sites include spindle whorls, pot supporters, shouldered axes, stepped adzes, hoes, perforated triangular polished slate points, bone and antler points, chisels, awls, and jade and serpentine rings and beads.

There is a great deal of pottery at Yuan-Shan sites. It is mainly buff, although orange and brown wares also occur. The most common vessel form is the globular jar, although bowls are also present. Some of the pottery has a red or brown slip, and a small percentage has decorations made by incision, ring impression, or painting. The decorations are small punctate dots, rows of incised circles, and dentate stamps. Some of these are very similar to ones from Lal-lo. The Yuan-Shan Culture dates from 4000 to 2000 B.P. (Chang 1969:172–188, 212–219).

The second area with pottery similar to Lal-lo is in Indonesia. The site is Kamassi on the Karama River in the Central Celebes. At the site were found ground stone axes, adzes, chisels, and arrowheads. A great deal of pottery was excavated, most of which has incised and impressed decorations. There are four major styles of decoration: (1) incised lines, some of which are very similar to those at Lal-lo; (2) small punctate dots with incised lines, some of which are very similar to those at Lal-lo; (3) incised lines with small incised circles, some of which are similar to those at Lal-lo, and (4) incised lines with half-circles, which are not particularly similar to those at Lal-lo (Callenfels 1951).

The third area with pottery similar to Lal-lo is western Micronesia. Excavations on Saipan, Tinian, and Rota found an early pottery called "Marianas Red," which dates from 1500 B.C. to possibly A.D. 500. This pottery has a red slip, and some sherds have lime-filled decorations of rows of circles, straight lines and zig-zag lines (Spoehr 1957). Excavations in Guam found red slipped pottery with incised decorations similar to those found by Spoehr, but they were not lime filled (Reinman 1968). Excavations on Tinian by Pellett uncovered Marianas Red sherds with similar lime-filled decorations, but also some black sherds with lime-filled decorations. Some of the red sherds had a flat top to the rim with decorations on this flat surface (Pellett and Spoehr 1961). These decoration types are similar to some of the Lal-lo pottery. The islands of western Micronesia are thought to have been settled from the Philippines or Indonesia (Bellwood 1978:282).

The fourth area outside the Philippines that has pottery similar to Lal-lo are early cultures of Melanesia. These cultures had an economy oriented toward marine fishing and shellfish collecting, and also conducted long distance inter-island trade. In the sites are found axes, adzes, shell fishhooks, shell ornaments, bone needles, and considerable quantities of pottery. It is on the basis of pottery decorations that these

cultures are divided into three major groups—Lapita, incised and applied relief, and paddle-impressed. All of these are thought to have their origins in the Philippines or northeast Indonesia between 4000–3300 B.P. The Melanesian cultures date from 3500–2000 BP. (Bellwood 1978:244, 247; Golson 1972:554). The Lapita is the best known of the three and also has the greatest similarity to Lal-lo.

The vessel forms of the Lapita Culture are bowls and globular and shouldered pots (Bellwood 1978:245). The lips are often flat, and many have a thickened flat lip (as at Lal-lo) (Golson 1971:69). Only a small percentage of sherds are decorated, but most of the decorated sherds are from open bowls and beakers, some of which are carinated. Some decorated sherds have a red slip or a white lime infill. Decorations occur on the outside of vessels as well as on the insides of bowls (Bellwood 1978:245, 247). These traits are all found at Lal-lo.

Lapita decorations are made by dentate stamp, toothed comb-like instruments, or incising. Designs range from very simple to very elaborate. The simpler ones include rows of incised parallel lines and curves, and small punctate dots. Elaborate ones are covered with small geometric designs which are very precisely arranged and finely made (Bellwood 1978:247; Garanger 1971:60; Gifford and Shutler 1956). The Lal-lo decorations are similar to many of the simpler Lapita ones, but not particularly to the elaborate ones.

The incised and applied-relief ceramics of Melanesia generally have globular pot shapes with incised geometric designs and/or applied lines and nubs, and sometimes zoomorphic handles. This pottery is not particularly similar to that from Lal-lo.

The paddle-impressed ceramics are not as widespread or as well known as the Lapita. They generally have a globular pot shape with small rectangular, rectanguloid, or closely spaced lines that are impressed with a paddle. Some also have simple geometric incised lines (Bellwood 1978:262). There are a few sherds with paddle-impressed rectangles from Lal-lo.

Of the three Melanesian ceramic traditions the Lal-lo pottery is most similar to the Lapita, particularly the simpler Lapita designs. Other similar traits are the large proportion of bowls; the thickened flat lips; carinated shoulders; red slip, white lime infill, and decorations on the inside of bowls.

As for the decorations themselves, there are other areas that also share a close relationship: the Sa-Huynh-Kalanay of the Philippines and part of Mainland Southeast Asia (Solheim 1964), and that from Kalumpang in Sulawesi (Heekeren 1972:185–189, Pls. 101 and 102). However, both of these cultures are later than initial Lapita or Lal-lo, and may represent later continuing contacts. The pottery from the Batungan Caves, Masbate, is more similar to Lal-lo, and also similar to Lapita, but it also dates after initial Lapita and Lal-lo. The Lal-lo Culture may have had an influence on both Masbate and early Lapita, as well as Micronesia. Lal-lo in turn may have been influenced by the Yuan-Shan Culture of Taiwan. Situated on a large river very near the sea, Lal-lo is in a good location for sea travel or contacts with other areas. The area of northern Luzon may be an important region for trade, contacts, and influence on other areas. The area certainly deserves further research with regard to these problems.

## CONCLUSIONS

Lal-lo is an important site. It has a distinctive ceramic assemblage, and possibly very early iron. Also, the area could have had trade or contacts with Taiwan, Mas-

bate, and Indonesia, and may have had an influence on early Micronesia and Lapita Culture.

Lal-lo itself and the area in general deserve further research. The site needs to be better dated. The use patterns of the site and how or if it relates to other sites in the area need to be determined. Further work in the area could also shed more light on trade, contacts, migrations, or other external relationships.

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## NOTE

1. Munsell colors: Orange: there are a range of colors for orange. 10R 5/6 red, 10R 5/8 red, 2.5YR 5/6 red, 2.5YR 5/8 red, 2.5YR 4/8 red, 5YR 5/8 yellowish red, 5YR 5/6 yellowish red, 7.5YR 5/8 strong brown, 5YR 5/3 reddish brown, 7.5YR 6/4 light brown. Buff: includes buff, beige, light yellowish grey, 2.5Y 7/2 light grey, 10YR 7/3 very pale brown, 10YR 7/4 very pale brown. Red slipped: These are mostly dark reds. 10R 4/6 red, 7.5R 4/4 weak red, 7.5R 4/6 red, 7.5R 3/6 dark red, 5R 4/4 weak red, 5R 4/6 red, 5R 4/8 red, 7.5R 4/8 red, 7.5R 4/10 red. The slip is on an orange, orange brown, or reddish brown base.

   Red brown: These are all various colors of reddish brown. 5YR 5/6 yellowish red, 5YR 4/6 yellowish red, 5YR 4/8 yellowish red, 2.5YR 4/6 red.

   Dark red brown and dark red brown slipped: These were the same colors. 2/5YR 3/4 dark reddish brown, 2.5YR 3/6 dark red.

   Black: 7.5YR 2/0.

   Grey tan: These are a light greyish brown. 10YR 6/3 pale brown, 10YR 5/2 greyish brown, 10YR 5/3 brown.

   Grey: A light grey. 10YR 6/1 light grey, 2.5Y 6/2 light brownish grey.

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